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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,718	02/09/2004	Adlai Smith	38203-6082B	3857
33123	7590	12/05/2006	EXAMINER	
HELLER EHRMAN LLP			KOYAMA, KUMIKO C	
4350 LA JOLLA VILLAGE DRIVE #700			ART UNIT	
7TH FLOOR			PAPER NUMBER	
SAN DIEGO, CA 92122			2876	

DATE MAILED: 12/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/775,718

Applicant(s)

SMITH ET AL.

Examiner

Kumiko C. Koyama

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 44-47 and 50-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 44-47 and 50-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Amendment received on September 21, 2006 has been acknowledged.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 44, 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt et al (US 5,805,290, as cited by the Applicant) in view of Templeton et al (US 6,269,322).

Ausschnitt '290 discloses an apparatus for determining overlay error and an overlay target having array elements (Fig 18), and an optical metrology tool is used to measure the array of elements (col 10, lines 33-35). The target comprises four sets of alignment attributes. The first set of alignment attributes 140 is disposed along a first column (Fig 18). The second set of alignment attributes 142 is complementary to the first set of alignment attributes and is disposed along a second column distinct from the first column, wherein the alignment attributes in the first and second sets are aligned in corresponding rows (Fig 18). The third set of alignment attributes 134 is distributed along the first row between the first and second column (Fig 18). The fourth set of alignment attributes 132 is complementary to the third set of attributes and is disposed in a second row distinct from the first row, wherein the alignment attributes in the third and fourth

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sets are aligned in corresponding columns (Fig 18). Ausschnitt '290 also teaches that the second and fourth alignment attributes are complementary to the first and third alignment attributes, respectively, in that an exposure of the second and fourth alignment attributes interlock with a previous exposure of the first and third alignment attributes (Fig 18). Ausschnitt '290 further teaches that his invention provides a process for determining critical dimension bias or overlay error in a substrate formed by a lithographic process by initially providing an array of elements on a substrate, the array comprising a plurality of spaced, substantially parallel elements having a length and a width. The sum of the width of an element and the spacing of adjacent elements define a pitch of the elements (col 3, lines 1-5).

Ausschnitt '290 fails to teach a stage that is shifted in a desired direction relative to the reticle. Ausschnitt '290 also fails to teach that the offset measurements of the exposed alignment attributes are used to determine a self referenced wafer stage overlay error map.

Templeton discloses a wafer stage 160 that is two-dimensionally movable in x-direction and y-direction. The stage 160 and wafer holder 150 are controlled by a controller 200. The controller 200 effects rotation of the wafer holder 150 and movement of the stage 160 via plurality of motors for wafer alignment and positioning (col 9, lines 10-18). Templeton also teaches that in a step-and-repeat type apparatus, the wafer is moved in steps by predetermined distances. The wafer typically is placed on a two-dimensionally movable stage and positioned relative to a projected image of a reduction projection type exposure apparatus (col 1, lines 62-67). Templeton also discloses that the coordinates (x_3 , y_3) and/or the geometric relationship between marks 284a and 284b may be employed by the processor 210 to map a virtual alignment

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mark so as to facilitate wafer alignment and mitigate overlay error due to reticle rotation errors and/or lens magnification errors.

Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to integrate the teachings of Templeton to the teachings of Ausschnitt '290 because the stage provides movements in smaller increments and thereby the system is able to provide a more minute adjustment to accurately align the reticles in its proper position.

3. Claims 45, 47, 52 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt '290 as modified by Templeton in view of Dao et al (US 5,700,602, as cited by the Applicant). Ausschnitt '290 as modified by Templeton have been discussed above.

Ausschnitt '290 as modified by Templeton fails to disclose that the reticle has reduced transmission.

Dao discloses an attenuated phase-shifting reticle that uses an embedded film, which is engineered to have a reduced transmission (col 2 lines 7-10).

In view of Dao, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to employ the teachings of Dao to the teachings of Ausschnitt '290 as modified by Templeton in order to minimize effects of diffraction, therefore resulting in more accurate reading of overlay measurement and improve the overlay alignment.

4. Claims 46 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ausschnitt '290 as modified by Templeton and Dao as applied to claim 45 above, and further in view of Fukuda (US 5,262,257, as cited by the Applicant). Ausschnitt '290/Templeton/Dao have been discussed above.

Ausschnitt '290/Templeton/Dao fails to teach a reticle comprising a partially reflecting dielectric coating.

Fukuda discloses an alignment patter of a mask formed by a dielectric material film 36 (col 3 lines 32-34).

In view of Fukuda, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to employ the teachings of Fukuda to the teachings of Ausschnitt '290/Templeton/Dao as modified by Dao in order to reflect the light and acquire proper image of the patter for overlay alignment.

Response to Arguments

5. Applicant's arguments filed September 21, 2006 have been fully considered but they are not persuasive.

The Applicant submits that an appropriate motivation to modify must be set forth in order to establish a *prima facie* case of obviousness. However, the Examiner believes proper motivation has been provided. The Examiner has stated in the office that the modification has been made because the stage of Templeton provides movements in smaller increments and thereby the system is able to provide a more minute adjustment to accurately align the reticles in its proper position. Templeton's wafer stages increases the capability of the Ausschnitt's apparatus by providing such fine adjustments, and therefore, it would have been obvious to combine Ausschnitt and Templeton.

With respect to Applicant's arguments regarding the combination fails to teach multiple sets of alignment attributes, the Examiner respectfully disagrees. The Applicant addresses that

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the present invention defines a set of attributes when it states “alignment attributes 1 and 2 form a complimentary pair, when combined by projecting and overlaying them one upon another they form a completed, readable alignment attribute.” However, the Examiner believes the alignment attributes pointed out by the Examiner in the rejection does read on the claimed recitation. The Applicant does not specifically define the term “complimentary” and according to the dictionary definition of “complimentary, “ the term conveys a meaning “expressing or containing a compliment” or “given free as a courtesy or favor.” Since the provided claims do not specifically describe the positional relativity as to what the term “complimentary” conveys in the attributes, the Examiner believes that the term “complimentary” can broadly be interpreted as an attribute being either positional opposite, next to or close to another attribute. Provided such interpretation by the Examiner, alignment attributes 142 of Ausschnitt is complimentary to alignment attributes 140 because alignment attributes 142 and 140 are facing opposite to each other. Similarly, alignment attributes 132 is complimentary to alignment attributes 134 because alignment attributes 132 and 134 are facing opposite to each other. Since the term “complimentary” can be broadly interpreted in many ways (opposite, next to or close to), all four of the alignment attributes 132, 134, 140, 142 are all complimentary to each other. Therefore, the Examiner believes that the Ausschnitt as modified by Templeton read on the claimed invention.

The Applicant submits that the combination fails to teach, suggest or imply sets of complementary alignment attributes that interlock “after the reticle has been shifted to a desired direction” and “creating an interlocking row or column of completed attributes, such that the positional offsets of the alignment attributes in the interlocking row or column of complete attributes.” The Examiner respectfully disagrees. The alignment attributes 132, 134 of Ausschnitt

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are interlocked between alignment attributes 140, 142. The alignment attributes 140, 142 represent column attributes and the alignment attributes 132, 134 are interlocked between the column attributes. Similar, the alignment attributes 132, 134 represent row attributes, and the alignment attributes 140, 142 are interlocked between the row attributes. As a result, Ausschnitt discloses creating an interlocking row or column. Although Ausschnitt does not specifically disclose the shifting of the reticle to a desired direction, such limitation is taught by Templeton's disclosure of a movable wafer stage for wafer alignment. Therefore, the Examiner believes that Ausschnitt as modified by Templeton read on the claimed invention.

The Applicant also submits that the combination fails to teach a combination useful "to determine a self referenced wafer stage overlay error map." The Applicant further submits that the wafer overlay errors are for a combination of reticle, stage, lens, and alignment mark detection errors. The proposed combination of the art determines this combined error but not any of the individual components. However, the Examiner respectfully disagrees. The Examiner believes that the limitation "to determine a self referenced wafer stage overlay error map" is taught by the combination of Ausschnitt and Templeton at least for the reason that Templeton discloses that the coordinates and/or the geometric relationship between marks are employed by the processor to map a virtual alignment mark so as to facilitate wafer alignment and mitigate overlay error due to reticle rotation errors and/or lens magnification errors. Although the combination may disclose each and every error component, the Applicant does not specifically disclose that overlay error map can be produced using any of the individual components. The currently presented claims do not distinguish whether the error is based on a combination or each

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individual component. Therefore, the Examiner believes that Ausschnitt as modified by Templeton read on the claimed invention.

With respect to Applicant's arguments regarding the combination would not have reasonable expectation of successfully determining "a self referenced wafer stage overlay error map," the Examiner respectfully disagrees because as provided in the above explanation, the claim does not recite that the wafer overlay errors are for any of the individual components. The Examiner's description of the combination of Ausschnitt and Templeton should now have reasonable expectation of success.

Therefore, the Examiner believes that arguments provided by the Applicant are not persuasive, and maintains the rejection as provided above. Subsequently, this action is Final.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kumiko C. Koyama whose telephone number is 571-272-2394. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on 571-272-2398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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November 28, 2006


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